Lammerite-β $Cu_3(AsO_4)_2$

Crystal Data: Monoclinic. *Point Group:* 2/*m*. As irregular prismatic grains, to 0.15 mm, with striations parallel to elongation.

Physical Properties: *Cleavage:* None observed. *Fracture:* n.d. *Tenacity:* Brittle. Hardness = n.d. D(meas.) = n.d. D(calc.) = 5.06

Optical Properties: Transparent. *Color:* Light to dark green. *Streak:* n.d.
Luster: Vitreous.
Optical Class: Biaxial (+). α = 1.887(5) β = 1.936(5) γ = 2.01(1) 2V(calc) = 81°
Dispersion: $r < v$, strong. *Pleochroism:* None observed.

Cell Data: *Space Group: $P2_1/c$*. a = 6.306(1) b = 8.643(1) c = 11.310(1) β = 92.26(1)°
Z = 4

X-ray Powder Pattern: Great fissure Tolbachik eruption, Kamchatka peninsula, Russia.
2.83 (100), 6.50 (10), 5.65 (10), 4.32 (10), 4.03 (5), 2.90 (5), 2.86 (5)

Chemistry:	(1)
CuO	51.30
ZnO	0.32
As_2O_3	49.12
Total	100.74

(1) Great fissure Tolbachik eruption, Kamchatka peninsula, Russia; average of 5 electron microprobe analyses; corresponding to $Cu_{3.00}Zn_{0.02}As_{1.99}O_8$.

Polymorphism & Series: The polymorph of lammerite.

Occurrence: The product of post-eruption fumarolic reactions (400–650 °C) in an active volcano.

Association: Euchlorine, piypite, alumokluchevskite, alarsite, lammerite.

Distribution: Second Scoria cone of the Northern Branch of the Great fissure Tolbachik eruption (1975–1976), Kamchatka peninsula, Russia.

Name: Signifies the monoclinic polymorph of *lammerite*, named to honor Franz Lammer, mineral collector of Leoben, Austria, who provided the first specimen.

Type Material: Mineralogical Museum, Saint Petersburg University, Saint Petersburg, Russia.

References: (1) Starova, G.L., L.P. Vergasova, S.*K.* Filatov, S.N. Britvin, and V.V. Ananyev (2011) Lammerite-β, $Cu_3(AsO_4)_2$ - a new mineral from fumaroles of the Great fissure Tolbachic eruption (Kamchatka, Russia). Zap. Ross. Mineral. Obshch., 140(5), 46–51 (in Russian, English abstract).
(2) (2013) Amer. Mineral., 98, 1080 (abs. ref. 1).